14/5,K/1 (Item 1 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01292280
Injection-molded phased array antenna system
PATENT ASSIGNEE:
Space Systems / Loral, Inc., (1326000), 3825 Fabian Way, Palo Alto, California 94303, (US), (Applicant designated States: all)
INVENTOR:
Metzen, Philip L., 1022 Rudder Lane, Foster City, California 94402, (US)
Bruno, Richmond D., 1370 Oak Knoll Drive, San Jose, California 95129, (US)
Smith, Terry M., 9703 Alpine Road, La Honda, California 94020, (US)
LEGAL REPRESENTATIVE:
Exell, Jonathan Mark et al (99691), Elkington & Fife Prospect House 8 Pembroke Road, Sevenoaks, Kent TN13 1XR, (GB)
PATENT (CC, No, Kind, Date): EP 1109252 A2 010620 (Basic)
EP 1109252 A3 020828
APPLICATION (CC, No, Date): EP 2000311143 001213;
PRIORITY (CC, No, Date): US 459695 991213
DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE; TR
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: H01Q-021/00 ; H01Q-021/06 ; H01Q-003/26 ; H01Q-001/28 ; H01Q-013/02

ABSTRACT EP 1109252 A2
An injection molded phased array antenna system (10) such as may advantageously employed on satellites. The antenna system (10) comprises a plurality of metal plated, injection molded plastic horn radiating elements (11) respectively coupled to a plurality of metal plated, injection molded plastic orthomode junctions (12) that produce a corresponding plurality of vertically and horizontally polarized outputs. Metal plated, injection molded plastic vertical and horizontal beamforming networks (14) are coupled to outputs of the plurality of orthomode junctions (12) that establish unique phases and amplitudes that produce two separate outputs associated with two independent beams. The beamforming networks (14) each comprise a plurality of metal plated, injection molded plastic fixed phase shifters (15) respectively coupled to outputs of the plurality of orthomode junctions (12), a plurality of metal plated, injection molded plastic two-way power combiner-divider networks (16) coupled to adjacent ones of the phase shifters (15), a plurality of metal plated, injection molded plastic eight-way power combiner-divider networks (17) coupled to the two-way power combiner-divider networks (16) by way of an intermediate structural panel, and a plurality of metal plated, injection molded plastic four-way power combiner-divider networks (18) coupled to the eight-way power combiners (17) by way of a main structural panel. The four-way power combiner-divider networks produce respective vertical and horizontal polarized outputs of the antenna system.
ABSTRACT WORD COUNT: 219
NOTE:
Figure number on first page: 1&2

LEGAL STATUS (Type, Pub Date, Kind, Text):
Application: 010620 A2 Published application without search report
Change: 020130 A2 Legal representative(s) changed 20011211

Change: 020828 A2 International Patent Classification changed: 20020710
Search Report: 020828 A3 Separate publication of the search report
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200125	581
SPEC A	(English)	200125	4667
Total word count - document A			5248
Total word count - document B			0
Total word count - documents A + B			5248

Injection-molded phased array antenna system
INTERNATIONAL PATENT CLASS: H01Q-021/00 ...

...ABSTRACT A2
An injection molded phased array antenna system (10) such as may advantageously employed on satellites. The antenna system (10) comprises ...

...SPECIFICATION present invention relates generally to satellites, and more particularly, to a low cost, injection molded phased array antenna system that may advantageously be used on satellites.
In addition to lower costs and...

...vehicles with larger shrouds are costly.
Transmit and receive functions are often separated into two antennas , each covering a narrow bandwidth, resulting in a reduction in transmit feed system losses and an improvement in antenna beam shape optimization efficiency. Improved transmit antenna performance reduces the high costs associated with supplying more solar array DC power, traveling wave tube amplifier (TWTA) RF power, and thermal control .
A deployed shaped-reflector antenna is frequently used to satisfy transmit requirements and an earth...

...are made of graphite composite materials.
It would therefore be advantageous to have an improved phased array antenna system which may be used on satellites that improves upon conventional antennas.
According to one aspect of the present invention, there is provided a phased array antenna system comprising:
a plurality of metal plated, injection molded plastic horn radiating elements;
a...

More particularly, the phased array antenna system comprises a plurality of metal plated, injected-molded radiating elements that include a...

...CLAIMS A2
1. A phased array antenna system comprising:
a plurality of metal plated, injection molded plastic horn radiating elements;
a...

14/5,K/2 (Item 2 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

01257180
Phased array antenna system
PATENT ASSIGNEE:
NAVSYS CORPORATION, (1500590), 14960 Woodcarver Road, Colorado Springs, Colorado 80921, (US), (Applicant designated States: all)
INVENTOR:
Brown, Alison K., 14960 Woodcarver Road, Colorado Springs, Colorado 80921, (US)
Brown, Peter K., 14960 Woodcarver Road, Colorado Springs, Colorado 80921, (US)
Matini, Amir H., 14960 Woodcarver Road, Colorado Springs, Colorado 80921, (US)
Norgard, John D., 14960 Woodcarver Road, Colorado Springs, Colorado 80921, (US)
LEGAL REPRESENTATIVE:
W.P. THOMPSON & CO. (101052), Celcon House 289-293 High Holborn, London WC1V 7HU, (GB)
PATENT (CC, No, Kind, Date): EP 1085599 A2 010321 (Basic)
APPLICATION (CC, No, Date): EP 307973 000914;
PRIORITY (CC, No, Date): US 395550 990914
DESIGNATED STATES: AT; BE; CH; CY; DE; DK; ES; FI; FR; GB; GR; IE; IT; LI; LU; MC; NL; PT; SE
EXTENDED DESIGNATED STATES: AL; LT; LV; MK; RO; SI
INTERNATIONAL PATENT CLASS: H01Q-019/06 ; H01Q-001/40 ; H01Q-003/26 ; H01Q-023/00

ABSTRACT EP 1085599 A2
A miniature phased array antenna system is described which employs a substrate having a high dielectric constant. A plurality of antenna elements is located on a surface of the substrate, and a superstrate having a high dielectric constant covers the antenna elements. The dielectric constant, thickness, and shape of the superstrate enable it to act as a dielectric lens for controlling the phase relationship of a signal received by the antenna elements. The design of the superstrate dielectric lens permits a reduction in the physical spacing between the antenna elements while maintaining spatial diversity in phase between signals arriving from different directions. Thus, the antenna array may be significantly smaller than previously proposed phased array antennas while maintaining a similar phase relationship to that achieved using previously proposed phased array antennas . Electronic circuitry coupled to each of the plurality of antenna elements applies complex weights to received signals prior to a summation thereof in order to reconstruct a desired signal and to deconstruct an undesired signal. SAW filters employed in the electronic circuitry are temperature controlled to maintain group-delay and phase-offset stability.
ABSTRACT WORD COUNT: 183
NOTE:
Figure number on first page: 1&2

LEGAL STATUS (Type, Pub Date, Kind, Text):
Application: 010321 A2 Published application without search report
Change: 020626 A2 Legal representative(s) changed 20020506
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	200112	592

SPEC A (English) 200112 3215
Total word count - document A 3807
Total word count - document B 0
Total word count - documents A + B 3807

Phased array antenna system
INTERNATIONAL PATENT CLASS: H01Q-019/06 ...

...ABSTRACT A2
A miniature phased array antenna system is described which employs a substrate having a high dielectric constant. A plurality of antenna elements is located on a surface of the substrate, and a superstrate having a high dielectric constant covers the antenna elements. The dielectric constant, thickness, and shape of the superstrate enable it to act as a dielectric lens for controlling the phase relationship of a signal received by the antenna elements. The design of the superstrate dielectric lens permits a reduction in the physical spacing between the antenna elements while maintaining spatial diversity in phase between signals arriving from different directions. Thus, the antenna array may be significantly smaller than previously proposed phased array antennas while maintaining a similar phase relationship to that achieved using previously proposed phased array antennas . Electronic circuitry coupled to each of the plurality of antenna elements applies complex weights to received signals prior to a summation thereof in order to...

...signal and to deconstruct an undesired signal. SAW filters employed in the electronic circuitry are temperature controlled to maintain group-delay and phase-offset stability.

SPECIFICATION The present invention relates to phased array antennas, and it will be illustrated below, by way of example with reference to a miniature phased array antenna.
Phased array antennas are used in a variety of aerospace applications. A phased array antenna has a number of antenna elements that are aligned in phase to provide transmit...

...assigned to each DSP logic block 62 and each receiver processing channel 73 allow the phased array antenna pattern to be optimized for each LIPS satellite to be tracked by the receiver processor board 72. The use of digital electronics allows the phased array antenna electronics module 60 to compensate for amplitude and phase distortions caused by the superstrate...temperature changes.

CLAIMS 1. A phased array antenna system including
a dielectric substrate having a plurality of antenna elements on a first
...

...in order to reconstruct a desired signal and to deconstruct an undesired signal.
17. A phased array antenna electronics module as claimed in claim 16, wherein the digital electronic circuitry includes one or more filter elements and temperature control means for maintaining the one or more filter elements at a constant desired temperature.
18. A phased array antenna electronics module as claimed in claim 17, wherein the filter elements include surface acoustic wave (SAW) filters.

19. A phased array antenna electronics module as claimed in claim 16, wherein the digital electronic circuitry includes a digital front end unit for digitizing the incoming antenna signals and temperature control means for maintaining the digital front end unit at a constant desired temperature.
20. A phased array antenna electronics module as claimed in claim 16, wherein the temperature control means includes one or more temperature controlled ovens, each of which encloses a respective one of the one or more filter elements.

14/5,K/3 (Item 3 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00955953
Deployed payload for a communications spacecraft
PATENT ASSIGNEE:
Space Systems/Loral, Inc., (2367220), 3825 Fabian Way, Palo Alto, California 94303, (US), (applicant designated states: DE;FR;GB;IT)
INVENTOR:
Cherrette, Alan R., 2240 Homestead Court, No. 313, Los Altos, California 94024, (US)
LEGAL REPRESENTATIVE:
Exell, Jonathan Mark et al (99691), Elkington & Fife Prospect House 8 Pembroke Road, Sevenoaks, Kent TN13 1XR, (GB)
PATENT (CC, No, Kind, Date): EP 866516 A1 980923 (Basic)
APPLICATION (CC, No, Date): EP 98302117 980320;
PRIORITY (CC, No, Date): US 823788 970321
DESIGNATED STATES: DE; FR; GB; IT
INTERNATIONAL PATENT CLASS: H01Q-001/28

ABSTRACT EP 866516 A1
The integration of travelling wave tube amplifiers (24) and multiplexers (20) onto passive transmit array antenna panels (18) deployed out board of a spacecraft bus (10) to simultaneously provide a spacecraft transponder that permits antenna pattern flexibility in orbit, high DC to RF power conversion efficiency, facilitates higher spacecraft power and provides a spacecraft with deployed payload panel architecture having multiple independent beams that can be electronically reconfigured on the ground or in orbit.
ABSTRACT WORD COUNT: 75

LEGAL STATUS (Type, Pub Date, Kind, Text):
Change: 000503 A1 Legal representative(s) changed 20000310
Examination: 20000119 A1 Date of dispatch of the first examination report: 19991130
Change: 020130 A1 Legal representative(s) changed 20011211
Change: 001227 A1 Legal representative(s) changed 20001109
Application: 980923 A1 Published application (A1with Search Report ;A2without Search Report)
Examination: 981118 A1 Date of filing of request for examination: 980916
Change: 990602 A1 Designated Contracting States (change)
LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:
Available Text Language Update Word Count

CLAIMS A (English) 9839 467
SPEC A (English) 9839 2787
Total word count - document A 3254
Total word count - document B 0
Total word count - documents A + B 3254

INTERNATIONAL PATENT CLASS: H01Q-001/28

...SPECIFICATION More particularly, U.S. Patent 5,327,150 issued July 5, 1994 to Cherrette entitled " PHASED ARRAY ANTENNA FOR EFFICIENT RADIATION OF MICROWAVE AND THERMAL ENERGY" discloses an active phased array antenna that includes a plurality of subarrays having an upper RF radiating panel assembly including...

...cold space.
U.S. Patent 5,293,171 issued Mar. 8, 1994 to Cherrette entitled: PHASED ARRAY ANTENNA FOR EFFICIENT RADIATION OF HEAT AND ARBITRARILY POLARIZED MICROWAVE SIGNAL POWER discloses an active phased array antenna panel that radiates heat and arbitrarily polarized microwave signal power. The active array panel...
...feed network in the subarray element is embedded in a dielectric material with a high thermal conductivity to efficiently distribute heat. The active array further includes an electronics module for each subarray...

...amplifier, phase shifter and associated electronics mounted in a housing made of material with high thermal conductivity . Each electronics module and corresponding subarray ...to a spacecraft.
Fig. 4 is an illustration of a section of a deployed passive phased array panel.
Figs. 5 and 6 are illustrations of a back surface and an end view of passive phased array antenna panel.
Fig. 7 is an illustration depicting how a deployed passive phased array antenna panel radiates all internally generated heat and RF power out from the front and...

...side views of a more detailed illustration of a quarter section of a deployed passive phased array panel containing one phased array antenna.
Like numerals refer to like parts throughout the disclosure.
Figures 1, 2 and 3...Depending on the thermal dissipation, heat pipes may be required to provide a more even temperature distribution . The back thermal radiating surface is mechanically attached to the back side of the panel assembly.
Although the...

...CLAIMS RF signals from the passive array antenna panel (12, 14).
6. An electronically reconfigurable passive antenna panel (12, 14) as claimed in any one of the preceding claims, wherein the at least one passive transmit array antenna (18) is coated with thermal control material having high thermal emissivity and low solar absorption.
7. An electronically reconfigurable passive antenna...

14/5,K/4 (Item 4 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00601858
Lightweight patch radiator antenna

PATENT ASSIGNEE:
RAYTHEON COMPANY, (745340), 141 Spring Street, Lexington Massachusetts 02173, (US), (applicant designated states: DE;FR;GB;IT)
INVENTOR:
Schuss, Jack J., 25 Dunbar Street, Sharon, MA 02067, (US)
LEGAL REPRESENTATIVE:
Jackson, David Spence et al (32231), REDDIE & GROSE 16, Theobalds Road, London, WC1X 8PL, (GB)

PATENT (CC, No, Kind, Date): EP 596618 A2 940511 (Basic)
EP 596618 A3 941117
EP 596618 B1 980304
APPLICATION (CC, No, Date): EP 93308200 931014;
PRIORITY (CC, No, Date): US 972011 921105
DESIGNATED STATES: DE; FR; GB; IT
INTERNATIONAL PATENT CLASS: H01Q-021/06 ; H01Q-009/04 ; H01Q-001/28

ABSTRACT EP 596618 A2

A lightweight patch radiator phased array antenna has each patch radiator (14) in the form of a single layer patch construction on an artificial dielectric (36), such as syntactic foam, which achieves a factor-of-ten weight saving over an array constructed with conventional materials. An additional sixty-five percent weight reduction is achieved by cutting away the dielectric material down to the array antenna 's ground plane (11) everywhere except under the patch radiator. This construction allows placement of a thermal control material (30) over the patch element (34) and ground plane (11) for space applications. Each patch radiator (14) includes at least one conductive probe (42) for receiving radio frequency power. Each probe (42) is mounted in a conductive cylinder (46) that extends through the dielectric layer (36) to the patch element (34). (see image in original document)
ABSTRACT WORD COUNT: 138

LEGAL STATUS (Type, Pub Date, Kind, Text):

Application:	940511	A2	Published application (A1with Search Report ;A2without Search Report)
Change:	941019	A2	International patent classification (change)
Change:	941019	A2	Obligatory supplementary classification (change)
Search Report:	941117	A3	Separate publication of the European or International search report
Examination:	950614	A2	Date of filing of request for examination: 950413
Examination:	970226	A2	Date of despatch of first examination report: 970114
Grant:	980304	B1	Granted patent
Oppn None:	990224	B1	No opposition filed

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	9810	909
CLAIMS B	(German)	9810	862
CLAIMS B	(French)	9810	1116
SPEC B	(English)	9810	2921

Total word count - document A 0
Total word count - document B 5808
Total word count - documents A + B 5808

INTERNATIONAL PATENT CLASS: H01Q-021/06 ...

...ABSTRACT A2
A lightweight patch radiator phased array antenna has each patch radiator (14) in the form of a single layer patch construction on...

...percent weight reduction is achieved by cutting away the dielectric material down to the array antenna 's ground plane (11) everywhere except under the patch radiator. This construction allows placement of a thermal control material (30) over the patch element (34) and ground plane (11) for space applications. Each...

...SPECIFICATION in particular to a lightweight patch radiator antenna for use in an airborne or spaceborne phased array antenna.
It is known in the art that a patch radiator consists of a conductive ...

...patch, that launches the useable electromagnetic waves into free space.
Patch elements are advantageous in phased arrays because they are compact, they can be integrated into a microwave array very conveniently, they...

...of large arrays of elements.
For some applications a major drawback to the use of phased array antenna systems is their high cost because of the need for hundreds or thousands of...

...Massachusetts. The present invention of a lightweight patch radiator antenna reduces the weight drawback and thermal control considerations related to the array antenna surface coatings in spaceborne applications. An aspect of the invention that helps to reduce weight is that there is no dielectric material between the patches. An antenna wherein the dielectric material is removed between the patches is however known from DE-A...

...for space applications.
It is a further object of this invention to provide a lightweight phased array antenna for space applications.
These objects are generally attained by selectively reducing the quantity of...

...by providing a patch radiator antenna comprising an antenna panel having a ground plane, a thermal control material bonded to the ground plane surface of the antenna panel, a plurality of patch radiators arranged on the antenna panel in a spaced apart manner with no dielectric material between the patch radiators, each...

...of the dielectric means, a flange bonded to the second surface of the dielectric means, thermal control material bonded to the patch element, and probe means extending from the patch radiator for coupling the patch element to an RF signal source. The antenna panel preferably comprises an aluminum honeycomb material. The dielectric means preferably comprises a low weight, high dielectric, syntactic foam. The thermal

control material preferably comprises a flexible optical solar reflector or a thermal control paint.

The objects are further accomplished by providing a phased array antenna comprising an antenna panel having a ground plane, a thermal control material bonded to the ground plane surface of the antenna panel, a plurality of patch radiators arranged on the antenna panel in a spaced apart manner with no dielectric material between the patch radiators, a...

...of the dielectric means, a flange bonded to the second surface of the dielectric means, thermal control material bonded to the patch element, and probe means extending from the patch radiator for coupling the patch element to the T/R module. The antenna panel preferably comprises an aluminum honeycomb material. The dielectric means preferably comprises a low weight, high dielectric, syntactic foam. The thermal control material preferably comprises a flexible optical solar reflector or a thermal control paint.

The objects are further accomplished by a method for providing a lightweight patch radiator...

...having a ground plane, bonding to the ground plane surface of the antenna panel a thermal control material, arranging on the antenna panel in a spaced apart manner a plurality of patch radiators with no dielectric material...

...the dielectric means, bonding a flange to the second surface of the dielectric means, bonding thermal control material to the patch element, and coupling the patch element to an RF signal source with probe means extending from the patch radiator. The step of bonding a thermal control material preferably comprises bonding a flexible optical solar reflector.

The objects are further accomplished by a method for providing a phased array antenna comprising the steps of providing an antenna panel having a ground plane, bonding to the ground plane surface of the antenna panel a thermal control material, arranging on the antenna panel in a spaced apart manner a plurality of patch radiators with no dielectric material...the dielectric means, bonding a flange to the second surface of the dielectric means, bonding thermal control material to the patch element, and coupling the patch element to the T/R module with probe means extending from the patch radiator. The step of providing an antenna panel comprises the panel having an aluminum honeycomb material. The step of providing a dielectric...

...dielectric means comprising a low weight, high dielectric, syntactic foam. The step of bonding a thermal control material preferably comprises bonding a flexible optical solar reflector.

Brief Description of the Drawings

Other...

...in connection with the accompanying drawings wherein:

FIG. 1 is a simplified sketch of a phased array antenna comprising a plurality of patch radiators coupled to apparatus for generating RF signals;

FIG...

...of a patch radiator elevation signal at 1.622 GHz taken when embedded in a phased array of attenuated elements; and

FIG. 6 is a graph of the patch radiator signal at...

...the Preferred Embodiment

Referring initially to FIG. 1, it may be seen that a lightweight phased array antenna 10 according to the present invention includes a plurality of patch radiators 14 mounted...

...well as control signals and voltages to the plurality of T/R modules 15. The phased array antenna 10 operates in the L-band frequency range (1-2 GHz).

Referring now to...

...29. The antennule module 13 provides for minimal cost to manufacture and maintain such a phased array antenna 10.

It should be noted that the preferred embodiment of the invention shown in...polarization RF signals. On top of the patch element 34 is a layer of a thermal control material 30 such as a thermal flexible optical solar reflector (FOSR); it is attached to...

...with a pressure sensitive bonding film 32. Because there is no dielectric material on the antenna panel 12 except within each patch radiator 14, FOSR is useable for thermal control over the patch radiator 14 and the ground plane which is surface 11 of antenna panel 12. As an alternative to FOSR, a thermal control paint may be used depending on application requirements.

The two probes 42 of each patch...

...patch radiator 14. This approach has the further advantage of allowing the placement of the thermal control material 30 on the array ground plane or panel 12, thereby improving thermal performance. Since the patch radiator 14 only covers approximately 35% of the antenna panel 12 surface area, this results in a 3 times reduction in the dielectric which ...

...savings are significant. The present invention achieved a major weight decease in the L-band phased array antenna 10 operation whereas at higher frequencies less weight savings are achieved.

The patterns shown...

...CLAIMS antenna comprising:

an antenna panel (12), said panel providing a ground plane surface (11);

a thermal control material means bonded to said ground plane surface (11) of said antenna panel; and

a plurality of patch radiators (14) arranged on said antenna panel in a ...

...dielectric, syntactic foam.

4. The patch radiator antenna as recited in Claim 1 wherein:

said thermal control material means (30) comprises a flexible optical solar reflector.

5. The patch radiator antenna as recited in Claim 1 wherein:

said thermal control material (30) comprises a thermal control paint.

6. A phased array antenna comprising:

an antenna panel (12), said panel providing a ground plane surface (11);

a thermal control material means bonded to said ground plane surface

(11) of said antenna panel; and
a plurality of patch radiators (14) arranged on said antenna panel in a ...

...said patch radiator for coupling said patch element to said T/R module.

7. The phased array antenna as recited in Claim 6 wherein:

said antenna panel (12) comprises an aluminum honeycomb material means (27).

8. The phased array antenna as recited in Claim 6 wherein:

said dielectric means (34) comprises a low weight, high dielectric, syntactic foam.

9. The phased array antenna as recited in Claim 6 wherein:

said thermal control material means (30) comprises a flexible optical solar reflector.

10. The phased array antenna as recited in Claim 6 wherein:

said thermal control material (30) comprises a thermal control paint.

11. A method for providing a lightweight patch radiator antenna comprising the steps of...

...having a ground plane;
bonding to said ground plane surface of said antenna panel a thermal control material means;
arranging on said antenna panel in a spaced apart manner a plurality of ...

...material means (30) comprises using a thermal control paint.

16. A method for providing a phased array antenna comprising the steps of:
providing an antenna panel (12) having a ground plane;
bonding to said ground plane surface of said antenna panel a thermal control material means;
arranging on said antenna panel in a spaced apart manner a plurality of ...

14/5,K/5 (Item 5 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00469951
EHF array antenna backplate.
PATENT ASSIGNEE:
HUGHES AIRCRAFT COMPANY, (214919), 7200 Hughes Terrace, Los Angeles, CA 90045-0066, (US), (applicant designated states: DE;FR;GB;IT)
INVENTOR:
Wong, Harry, 1764 South Ask Drive, Monterey Park, CA 91754, (US)
Chang, Stanley S., 2629 Via Valdes, Palos Verdes Estates, CA 90274, (US)
Chang, Donald C.D., 3142 Montangne Way, Thousend Oaks, CA 91362, (US)
Kelly, Kenneth C., 4655 Natick Ave. No.12, Sherman Oaks, CA 91403, (US)
LEGAL REPRESENTATIVE:
Patentanwalte Grunecker, Kinkeldey, Stockmair & Partner (100721), Maximilianstrasse 58, W-8000 Munchen 22, (DE)

PATENT (CC, No, Kind, Date): EP 476675 A1 920325 (Basic)
APPLICATION (CC, No, Date): EP 91115982 910919;
PRIORITY (CC, No, Date): US 585553 900920
DESIGNATED STATES: DE; FR; GB; IT
INTERNATIONAL PATENT CLASS: H01Q-021/00
CITED PATENTS (EP A): EP 252779 A; US 4120085 A; US 4851856 A; GB 2211025 A
CITED REFERENCES (EP A):
Conference Proceedings "Military Microwaves '88" 5-7 July 1988,London,Great Britain,pp 293-298 R.J.Mailloux: "Progress in Printed Circuit Array Antennas";

ABSTRACT EP 476675 A1

An EHF array antenna backplate (30) that integrates thermal cooling structure and signal processing structure together into one unified structure. In one embodiment, forced air is employed to conduct heat from active modules; while in another embodiment, embedded heat pipes are employed. The array backplate is made by using four layers. The layers are: a high density multichip interconnect board (31), a metal matrix composite motherboard (22), an integrated waveguide/cavity/cooling structure (33), and a metal matrix composite baseplate (34). Each module uses solder bumps to connect to the high density multichip interconnect board where DC power and control logic signal distribution takes place. The modules are soldered in four locations to the metal matrix composite motherboard through openings in the high density multichip interconnect board. EHF signals are coupled to the modules from a resonant cavity (26) via probes that protrude through the high density multichip interconnect board. Probes are strategically located in the resonant cavity (36) to pick up an EHF standing wave generated by slots (34) that are part of a slotted planar waveguide EHF 16-way power divider network. The waveguide/cavity/cooling structure is also the primary load-bearing member of the backplate. (see image in original document)
ABSTRACT WORD COUNT: 200

LEGAL STATUS (Type, Pub Date, Kind, Text):

Application:	920325 A1	Published application (A1with Search Report ;A2without Search Report)
*Assignee:	920701 A1	Applicant (transfer of rights) (change): Hughes Aircraft Company (214913) 7200 Hughes Terrace P.O. Box 45066 Los Angeles, California 90045-0066 (US) (applicant designated states: DE;FR;GB;IT)
Examination:	921119 A1	Date of filing of request for examination: 920922
Examination:	941019 A1	Date of despatch of first examination report: 940907
Refusal:	960911 A1	Date on which the European patent application was refused: 960427

LANGUAGE (Publication,Procedural,Application): English; English; English
FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF1	788
SPEC A	(English)	EPABF1	2682
Total word count - document A			3470
Total word count - document B			0
Total word count - documents A + B			3470

INTERNATIONAL PATENT CLASS: H01Q-021/00

...SPECIFICATION A1

BACKGROUND

The present invention relates to a phased array antenna and, more particularly, to methods for constructing and apparatus comprising the backplate of phased arrays that incorporate active electronic modules.

It is an objective of the present invention to reduce or eliminate... described above exemplifies a unique backplate technology that is useful in the field of EHF phased array antennas having a plurality of heat dissipating active modules. It is a feature of the...

14/5,K/6 (Item 6 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00419725

Phased array antenna with temperature compensating capability.

PATENT ASSIGNEE:
NEC CORPORATION, (236690), 7-1, Shiba 5-chome Minato-ku, Tokyo, (JP), (applicant designated states: DE;FR;GB)
INVENTOR:
Kuwahara, Yoshihiko, c/o NEC Corporation, 7-1, Shiba 5-chome, Minato-ku, Tokyo, (JP)
LEGAL REPRESENTATIVE:
VOSSIUS & PARTNER (100311), Postfach 86 07 67, D-81634 Munchen, (DE)
PATENT (CC, No, Kind, Date): EP 417689 A2 910320 (Basic)
EP 417689 A3 910703
EP 417689 B1 950426
APPLICATION (CC, No, Date): EP 90117380 900910;
PRIORITY (CC, No, Date): JP 89232922 890911
DESIGNATED STATES: DE; FR; GB
INTERNATIONAL PATENT CLASS: H01Q-003/26
CITED PATENTS (EP A): EP 106438 A; EP 106438 A; EP 160581 A; EP 194244 A; US 4517570 A

ABSTRACT EP 417689 A2

The phased array antenna has a plurality of radiating elements (11), a power divider (13) for distributing transmitting power to the radiating elements, and a plurality of phase shifters (12) each being connected between the power divider (13) and respective one of the radiating elements (11), and scanning a beam by controlling the amounts of phase shift of the phase shifters. A characteristic compensating apparatus for the antenna comprises a monitor manifold coupled to the array of the radiating elements (11) for combining outputs radiated from the radiating elements and producing the greatest combined output as a monitor output when the antenna has a predetermined scanning angle. A phase error calculating means calculates, when the antenna radiates a scanning beam of the predetermined angle, phase errors between the outputs of the individual radiating elements and the output of the monitor manifold in response to the combined output of the monitor manifold. A phase shift compensating means compensates the amounts of phase shift of the individual phase shifters in response to the calculated phase errors. This phased array antenna sufficiently compensates for not only the changes in beam direction but also the

changes in beam shape and side lobe level due to temperature and, thereby, insuring the expected MLS performance.

ABSTRACT WORD COUNT: 213

LEGAL STATUS (Type, Pub Date, Kind, Text):

Application:	910320	A2	Published application (A1with Search Report ;A2without Search Report)
Examination:	910320	A2	Date of filing of request for examination: 901002
Search Report:	910703	A3	Separate publication of the European or International search report
Examination:	930825	A2	Date of despatch of first examination report: 930713
Grant:	950426	B1	Granted patent
Oppn None:	960417	B1	No opposition filed

LANGUAGE (Publication,Procedural,Application): English; English; English

FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS A	(English)	EPABF1	383
CLAIMS B	(English)	EPAB95	472
CLAIMS B	(German)	EPAB95	392
CLAIMS B	(French)	EPAB95	564
SPEC A	(English)	EPABF1	3288
SPEC B	(English)	EPAB95	3266
Total word count - document A			3671
Total word count - document B			4694
Total word count - documents A + B			8365

Phased array antenna with temperature compensating capability.

INTERNATIONAL PATENT CLASS: H01Q-003/26

...ABSTRACT A2

The phased array antenna has a plurality of radiating elements (11), a power divider (13) for distributing transmitting...

...phase shift of the individual phase shifters in response to the calculated phase errors. This phased array antenna sufficiently compensates for not only the changes in beam direction but also the changes...

...SPECIFICATION A3

PHASED ARRAY ANTENNA WITH TEMPERATURE COMPENSATING CAPABILITY

BACKGROUND OF THE INVENTION

The present invention relates to a phased array antenna having digital phase shifters and, more particularly, to a phased array antenna with a function of compensating for changes in characteristics ascribable to temperature.

A phased array antenna is capable of scanning a beam electrically and is used in a microwave landing system (MLS), for example. In MLS, a phased array antenna located on the ground transmits a reciprocating beam to aircraft, while the aircraft measures...

...to provide the antenna with an air conditioner. Although the air conditioner is applied for maintaining the temperature around the antenna constant and, therefore, for suppressing the changes in characteristics ascribable to temperature, it brings about...

...in running cost and low reliability.

The use of a monitor manifold associated with a phased array antenna is a conventional approach to reduce the change in beam pointing due to temperature...

...OF THE INVENTION

It is therefore an object of the present invention to provide a phased array antenna capable of sufficiently compensating for not only the changes in beam direction but also...

...and, thereby, insuring the expected MLS performance.

In accordance with the present invention, in a phased array antenna having a plurality of radiating elements, a power divider for distributing transmitting power to...

...with the accompanying drawings in which:

Fig. 1 is a block diagram schematically showing a phased array antenna having a prior art temperature compensating apparatus;

Fig. 2 is a diagram representative of a power divider generally applied to a phased array antenna, which is extremely susceptible to temperature;

Fig. 3 is a plot chart showing the changes in phase plane due to temperature heretofore observed with a phased array antenna;

Figs. 4 and 5 are graphs showing radiation patterns heretofore observed with a phase...

...disclosed in U.S. Patent 4,536,766, shown in Fig. 1. As shown, a phased array antenna has a plurality of radiating elements 11 spaced a predetermined distance apart and phase...which is predetermined by the located monitor manifold, and changes the scanning timing of the phased array antenna such that the difference becomes zero.

The integral monitor manifold 15 is generally implemented...

...on the increase in temperature.

Referring to Fig. 6, a temperature compensating apparatus for a phased array antenna embodying the present invention is shown. The illustrative embodiment is identical with the prior...the radiating element of interest. This is successful in maintaining the phase plane of a phased array antenna and, therefore, various characteristics of the antenna such as the beam shape, beam direction and side lobe level substantially constant at all times. Thus, the present invention realizes a phased array antenna having an excellent temperature characteristic. ...

...SPECIFICATION B1

The present invention relates to a phased array antenna having digital phase shifters and, more particularly, to a phased array antenna with a function of compensating for changes in characteristics ascribable to temperature.

A phased array antenna is capable of scanning a beam electrically and is used in a microwave landing system (MLS), for example. In MLS, a phased array antenna located on the ground transmits a reciprocating beam to aircraft, while the aircraft measures...

...and elevation angle thereof. This allows the aircraft to land along a predetermined route. A phased array antenna for the MLS application is generally required to have an accuracy of the order...

...compensation is effected.

In the light of this, it has been customary to provide the antenna with an air conditioner. Although the air conditioner is applied for maintaining the temperature around the antenna constant and, therefore, for suppressing the changes in characteristics ascribable to temperature, it brings about...

...in running cost and low reliability.

The use of a monitor manifold associated with a phased array antenna is a conventional approach to reduce the change in beam pointing due to temperature...

...an antenna array.

It is therefore an object of the present invention to provide a phased array antenna capable of sufficiently compensating for not only the changes in beam direction but also...

...the expected MLS performance. This object is solved with the features of the claims.

A phased array antenna as described has a plurality of radiating elements, a power divider for distributing transmitting...

...with the accompanying drawings in which:

Fig. 1 is a block diagram schematically showing a phased array antenna having a prior art temperature compensating apparatus;

Fig. 2 is a diagram representative of a power divider generally applied to a phased array antenna, which is extremely susceptible to temperature;

Fig. 3 is a plot chart showing the changes in phase plane due to temperature heretofore observed with a phased array antenna;

Figs. 4 and 5 are graphs showing radiation patterns heretofore observed with a phase...

...disclosed in U.S. Patent 4,536,766, shown in Fig. 1. As shown, a phased array antenna has a plurality of radiating elements 11 spaced in a predetermined distance apart and...which is predetermined by the located monitor manifold, and changes the scanning timing of the phased array antenna such that the difference becomes zero.

The integral monitor manifold 15 is generally implemented...

...on the increase in temperature.

Referring to Fig. 6, a temperature compensating apparatus for a phased array antenna embodying the present invention is shown. The illustrative embodiment is identical with the prior...the radiating element of interest. This is successful in maintaining the phase plane of a phased array antenna and, therefore, various characteristics of the antenna such as the beam shape, beam direction and side lobe level substantially constant at all times. Thus, the present invention realizes a phased array antenna having an excellent temperature characteristic. ...

...CLAIMS A3

1. A characteristic compensating apparatus for a phased array antenna comprising a power divider for dividing transmitting power into a plurality of outputs, a...

...each for receiving an output of respective one of said plurality of phase shifters, said phased array antenna performing

predetermined control over amounts of phase shift of said plurality of phase shifters...

...for receiving and combining outputs radiated from said plurality of radiating elements and, when said phased array antenna has a predetermined scanning angle, outputting a combined output as a monitor output;
phase error calculating means for calculating, when said phased array antenna radiates a scanning beam having said predetermined scanning angle, phase errors of the outputs...

...CLAIMS B1
1. A characteristic compensating apparatus for a phased array antenna comprising a power divider (13) for dividing transmitting power into a plurality of outputs...

...each of said plurality of phase shifters to have a phase-shift such that said phased array antenna delivers a scanning beam having a desired scanning angle, and characteristic compensating apparatus comprising...

...controls said plurality of phase shifters to have respective first phase-shifts such that said phased array antenna has a predetermined angle and, then, controls each phase shifter to have 90(degree...

...in said latches to deliver the scanning beam having the desired scanning angle from said phased array antenna.
2. An apparatus as claimed in claim 1, wherein
said phase error calculating means...

14/5,K/7 (Item 7 from file: 348)
DIALOG(R)File 348:EUROPEAN PATENTS

00320144
A regulating switch for transmitting modules in a phased array radar.
PATENT ASSIGNEE:
GENERAL ELECTRIC COMPANY, (203903), 1 River Road, Schenectady, NY 12345, (US), (applicant designated states: BE;DE;FR;GB;IT)
INVENTOR:
Peil, William, 406 Ruth Road, North Syracuse New York 13212, (US)
Perkins, Donald William, 210 Newfield Road, Dewitt New York 13214, (US)
LEGAL REPRESENTATIVE:
Pratt, Richard Wilson et al (46454), London Patent Operation G.E. Technical Services Co. Inc. Essex House 12/13 Essex Street, London WC2R 3AA, (GB)
PATENT (CC, No, Kind, Date): EP 323170 A2 890705 (Basic)
EP 323170 A3 901227
EP 323170 B1 940601
APPLICATION (CC, No, Date): EP 88312250 881222;
PRIORITY (CC, No, Date): US 138795 871228
DESIGNATED STATES: BE; DE; FR; GB; IT
INTERNATIONAL PATENT CLASS: G01S-007/28 ; G05F-001/575
CITED PATENTS (EP A): US 4618813 A; DE 3725009 A; US 4682369 A
CITED REFERENCES (EP A):

ELECTRONIC ENGINEERING, vol. 51, no. 618, February 1979, page 23, London, GB; S. JAYASIMHA PRASAD: "MOS power FETs make excellent voltage regulators";

ABSTRACT EP 323170 A2

The invention relates to compact means for turning power on and off and regulating that power as it is supplied to a pulsed transmitting module in a phased array radar system. The arrangement comprises an operational amplifier, which compares the voltage across the module with a gated programmable digital voltage reference, and a high bandwidth power transistor serially connected with the load, the conductivity of which is controlled to adjust the load voltage to the reference value. Capacitive coupling prevents burnout of the transmitting module from a sustained "on" signal and a capacitive feedback connection at the operational amplifier limits the rise time of the voltage supplied to the load to avoid ringing. The use of a "switch" in a regulating mode reduces the amount of local storage capacity required to achieve comparable regulation, and leads to a power conditioner for an individual transmitting module, which is both compact and of high performance. The programmable nature of the voltage reference allows for convenient "tapering" of the power supplied from each module to the associated antenna element.

ABSTRACT WORD COUNT: 180

LEGAL STATUS (Type, Pub Date, Kind, Text):

Application:	890705	A2	Published application (A1with Search Report ;A2without Search Report)
Search Report:	901227	A3	Separate publication of the European or International search report
Examination:	910213	A2	Date of filing of request for examination: 901213
Examination:	921223	A2	Date of despatch of first examination report: 921105
Grant:	940601	B1	Granted patent
Oppn None:	950524	B1	No opposition filed

LANGUAGE (Publication,Procedural,Application): English; English; English

FULLTEXT AVAILABILITY:

Available Text	Language	Update	Word Count
CLAIMS B	(English)	EPBBF1	1065
CLAIMS B	(German)	EPBBF1	942
CLAIMS B	(French)	EPBBF1	1287
SPEC B	(English)	EPBBF1	7641
Total word count - document A			0
Total word count - document B			10935
Total word count - documents A + B			10935

A regulating switch for transmitting modules in a phased array radar.

INTERNATIONAL PATENT CLASS: G01S-007/28 ...

...to permit the necessary air passages required to carry off the heat generated.

In the phased array radar system under consideration, each T/R sub-assembly is required to stay within the...presence of gain in the feedback loop, linearity is not required for the loop to stabilize and the device may be operated any where in its active region. Thus, like other amplifiers...

...used to provide a smoothly variable (if not linear) conductivity as required to provide a regulating switching action.

The choice of an N-MOS power transistor as the regulating drain switch as...Together these elements provide the high performance required of a power supply system operating a phased array radar system. The drain switch of the present invention is, of course, not limited to...

14/5,K/8 (Item 8 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00787212 **Image available**
COMPACT PHASED ARRAY ANTENNA SYSTEM, AND A METHOD OF OPERATING SAME
Patent Applicant/Assignee:
RAYTHEON COMPANY, 141 Spring Street, Lexington, MA 02421, US, US (Residence), US (Nationality)
Inventor(s):
HAWS James L, 15354 Plum Lane, McKinney, TX 75070, US,
SHORT Byron Elliott Jr, 1300 Red Oak Trail, Fairview, TX 75069, US,
Legal Representative:
MILLS Jerry W (agent), Baker & Botts L.L.P., 2001 Ross Avenue, Dallas, TX 75201-2980, US,
Patent and Priority Information (Country, Number, Date):
Patent: WO 200120722 A1 20010322 (WO 0120722)
Application: WO 2000US25255 20000914 (PCT/WO US0025255)
Priority Application: US 99397486 19990916
Designated States: AE AG AL AM AT AT (utility model) AU AZ BA BB BG BR BY BZ CA CH CN CR CU CZ CZ (utility model) DE DE (utility model) DK DK (utility model) DM DZ EE EE (utility model) ES FI FI (utility model) GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP KR KR (utility model) KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL PT RO RU SD SE SG SI SK SK (utility model) SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW
(EP) AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
(OA) BF BJ CF CG CI CM GA GN GW ML MR NE SN TD TG
(AP) GH GM KE LS MW MZ SD SL SZ TZ UG ZW
(EA) AM AZ BY KG KZ MD RU TJ TM
Main International Patent Class: H01Q-021/00
International Patent Class: H01Q-001/02 ; H01Q-001/28
Publication Language: English
Filing Language: English
Fulltext Availability:
Detailed Description
Claims
Fulltext Word Count: 5101

English Abstract
An antenna system (10) includes circuitry (13) and an antenna unit (12). The antenna unit includes a multi-layer circuit board (21). The circuitry provides radio frequency signals, control signals and power to the circuit board. The circuit board has an array of antenna elements (23) on one side thereof, and has a plurality of modules (71, 72) soldered to and projecting outwardly from the opposite side thereof. The modules each have electronic circuitry thereon, which is electrically coupled to the circuit board. Each module includes a thermal transfer element (96), the heat generated by the electronic components on that module being

thermally transferred by the thermal transfer element to a cooling section (51).

Legal Status (Type, Date, Text)
Publication 20010322 A1 With international search report.
Examination 20011025 Request for preliminary examination prior to end of 19th month from priority date
COMPACT PHASED ARRAY ANTENNA SYSTEM, AND A METHOD OF OPERATING SAME
Main International Patent Class: H01Q-021/00
International Patent Class: H01Q-001/02 ...

... H01Q-001/28
Fulltext Availability:
Detailed Description

Detailed Description
COMPACT PHASED ARRAY ANTENNA SYSTEM,
AND A METHOD OF OPERATING SAME
TECHNICAL FIELD OF THE INVENTION
This invention relates in general to an antenna system and, more particularly, to a compact phased array antenna system suitable for use in a satellite, and a method of operating such an antenna system.

BACKGROUND OF THE INVENTION
Active phased array antenna systems are used in a wide variety of applications. As one example, a satellite...

...circuits, which in turn can affect temperature gradients across the array.

In particular, in a phased array antenna system, the existence of temperature gradients across the array can produce phase errors, which...

...antenna operation, the smaller the permissible temperature gradients across the array. For example, where the phased array is operating at a frequency of about 5 GHz, the maximum allowable temperature gradient across...

...below the maximum allowable gradient, then it is necessary to provide additional circuitry in the antenna system to effect dynamic phase error control compensation, which increases the complexity, cost and weight of the antenna system. Thus, it is important to have an efficient technique for cooling the circuitry of the antenna system, so that a substantially uniform temperature is maintained across the array.

one traditional phased array antenna system has a configuration commonly known as an array slat arrangement, and uses forced...in FIGURE 1 is an antenna system of the type commonly known as an active phased array antenna system.

The antenna unit 12 includes a multi-layer circuit board 21. The circuit...disclosed embodiment includes an L-shaped element

which is made of material with a high thermal conductivity , in order to facilitate the transfer of heat from the module to the cooling section...

...the modules to the cooling section. Yet another example involves the fact that the disclosed antenna unit has a multi-beam capability, but it will be recognized that the invention can be utilized in antenna units configured with single beam capability. Other substitutions and alterations are also possible without departing...

14/5,K/9 (Item 9 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT
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00309864
A LARGE PHASED - ARRAY COMMUNICATIONS SATELLITE
Patent Applicant/Assignee:
ERICSSON INC,
Inventor(s):
DENT Paul W,
Patent and Priority Information (Country, Number, Date):
Patent: WO 9528016 A1 19951019
Application: WO 95US4286 19950407 (PCT/WO US9504286)
Priority Application: US 94225389 19940408
Designated States: AM AT AU BB BG BR BY CA CH CN CZ DE DK EE ES FI GB GE HU IS JP KE KG KP KR KZ LK LR LT LU LV MD MG MN MW MX NO NZ PL PT RO RU SD SE SG SI SK TJ TM TT UA UG UZ VN KE MW SD SZ UG AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE BF BJ CF CG CI CM GA GN ML MR NE SN TD TG
Main International Patent Class: H01Q-025/00
International Patent Class: H01Q-01:28 ; H04B-07:204
Publication Language: English
Fulltext Availability:
Detailed Description
Claims
Fulltext Word Count: 4771

English Abstract
A communications satellite is disclosed which uses distributed multiplexing and demultiplexing so as to minimize the amount of cabling needed between deployable phased array panels and a central processor. Signals are distributed from the active array panels to a member of active antenna elements. Each active antenna element has at least a radiating element, a modulator and a sample and hold circuit for forming modulation waveforms.

A LARGE PHASED - ARRAY COMMUNICATIONS SATELLITE
Main International Patent Class: H01Q-025/00
International Patent Class: H01Q-01:28 ...
Fulltext Availability:
Detailed Description
Claims

14/5,K/10 (Item 10 from file: 349)

DIALOG(R)File 349:PCT FULLTEXT

00281748
MODULAR COMMUNICATION SATELLITE
Patent Applicant/Assignee:
TELEDESIC CORPORATION,
Inventor(s):
STUART James R,
Patent and Priority Information (Country, Number, Date):
Patent: WO 9429927 A1 19941222
Application: WO 94US6261 19940608 (PCT/WO US9406261)
Priority Application: US 9375425 19930611
Designated States: AT AU BB BG BR BY CA CH CN CZ DE DK ES FI GB HU JP KP KR KZ LK LU LV MG MN MW NL NO NZ PL PT RO RU SD SE SK UA UZ VN AT BE CH DE DK ES FR GB GR IE IT LU MC NL PT SE BF BJ CF CG CI CM GA GN ML MR NE SN TD TG
Main International Patent Class: H01Q-001/28
International Patent Class: H01Q-01:08 ; B64G-01:44; B64G-01:58
Publication Language: English
Fulltext Availability:
Detailed Description
Claims
Fulltext Word Count: 6626

English Abstract
The preferred embodiment of the Modular Communication Satellite (10) includes a foldable, high-gain, electronically steered antenna array (12) that is always pointed toward the Earth (E). The unfolded spacecraft resembles an opened flower. Polygonal antenna panels (92, 94, 96, 102, 104, and 106) are attached to each other and to a primary bus structure (22) by antenna deployment hinges (90). The upper portion of the satellite (10) incorporates intersatellite antenna arrays (26) of individual intersatellite antennas (28), which are always pointed tangentially to the Earth (E). An AstromastTM boom (32) is mounted between the space facing surface of the primary bus structure (22) and an assembly of solar array storage booms (36). The AstromastTM boom (32) can expand and rotate amorphous silicon solar arrays (38) which are unfurled from within the solar array storage booms (36). The amorphous silicon solar arrays (38) gather solar radiation to provide power the satellite (10), and furnish thermal control for the satellite (10) by shielding it from solar radiation. The satellite is capable of being nested or stacked in a compact arrangement that fits within a payload bay of a launch vehicle (LV).

Main International Patent Class: H01Q-001/28
International Patent Class: H01Q-01:08 ...
Fulltext Availability:
Detailed Description

English Abstract
...preferred embodiment of the Modular Communication Satellite (10) includes a foldable, high-gain, electronically steered antenna array (12) that is always pointed toward the Earth (E). The unfolded spacecraft resembles an opened flower. Polygonal antenna panels (92, 94, 96, 102, 104, and 106) are attached to each other and to a primary bus structure (22) by antenna deployment hinges (90). The upper portion of the satellite (10) incorporates intersatellite antenna arrays (26) of individual intersatellite antennas (28), which are always pointed tangentially to the Earth (E). An AstromastTM boom (32) is...

...silicon solar arrays (38) gather solar radiation to provide power the satellite (10), and furnish thermal control for the satellite (10) by shielding it from solar radiation. The satellite is capable of...

Detailed Description
... silicon solar arrays gather solar radiation to provide power for the satellite, and also provide thermal control for the satellite by shielding the satellite from solar radiation. The satellite is capable of ...

...of 20 GHz downlinks 16. The Earth-facing antenna array 12 comprises individual electronically steered phased - array antennas 18 located on eight mobile, fixed terminal satellite link M/FTSL antenna panel sets...

14/5,K/11 (Item 11 from file: 349)
DIALOG(R)File 349:PCT FULLTEXT

00149458
A TRANSMIT-RECEIVE MEANS FOR PHASED - ARRAY ACTIVE ANTENNA SYSTEM
Patent Applicant/Assignee:
WESTINGHOUSE ELECTRIC CORPORATION,
Inventor(s):
NATHANSON Harvey C,
DRIVER Michael C,
CRESSWELL Michael W,
FREITAG Ronald G,
ALEXANDER Donald K,
YAW Daniel F,
Patent and Priority Information (Country, Number, Date):
Patent: WO 8806351 A1 19880825
Application: WO 88US312 19880125 (PCT/WO US8800312)
Priority Application: US 87490 19870211
Designated States: AT BE CH DE FR GB IT JP LU NL SE
Main International Patent Class: H01Q-003/26
International Patent Class: G01S-07:02
Publication Language: English
Fulltext Availability:
Detailed Description
Claims
Fulltext Word Count: 11814

English Abstract
An improved phased - array active antenna transmit-receive apparatus (1a, 1b) utilizing a multiplicity of individual transmit-receive cells (7) positioned in an array format upon a common wafer (17) of semiconductor material. Each transmit-receive cell (7) comprises a multiplicity of redundant, integrated circuit, electronic devices implanted upon the common semiconductor substrate (17). The transmit-receive cells (7) utilize novel mitered mechanical switches to permanently interconnect individual electronic devices into either transmit or receive circuits during the fabrication and test of the transmit-receive cells (7). Radio frequency and direct current input and output vias (57, 61, 62) formed from a novel metal evaporation technique connect the devices upon the surface of the common semiconductor wafer (17) to underlying, insulated direct current distribution circuits (66) and a radio frequency manifold (67). This

array of improved phased - array active antenna transmit-receive apparatus (1a, 1b) comprised of transmit-receive cells (7) sharing common central processing unit (2), logic control (5) and heat dissipation apparatus (11) results in a significant reduction in the size and weight of the standard phased - array active antenna system.

A TRANSMIT-RECEIVE MEANS FOR PHASED - ARRAY ACTIVE ANTENNA SYSTEM
Main International Patent Class: H01Q-003/26
International Patent Class: G01S-07:02
Fulltext Availability:
  Detailed Description
  Claims

Detailed Description
  A TRANSMIT-RECEIVE MEANS FOR
   PHASED - ARRAY ACTIVE ANTENNA SYSTEM

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Set     Items   Description
S1     133865   (TEMPERATURE? ? OR THERMAL)(2N)(CONTROL? OR MAINTAIN? OR P-
             ROFILE? OR DISTRIBUT? OR CONDUCTIV? OR MEASURE OR MEASURES OR
             MEASUREMENT OR MEASUREMENTS)
S2      45859   ANTENNA?
S3     524134   PROTUSION? ? OR PROTRUDE? ? OR EXTRUDE? ? OR EXTRUSION? ? -
             OR BUMP? ? OR DIMPLE? ? OR PROJECT OR PROJECTS OR PROJECTION?
             ? OR NODE? ? OR NODULE? ? OR BUMP? ? OR FIN OR FINS
S4     212004   CONTROLS
S5       3561   S4(2N)(TEMPERATURE? ? OR THERMAL)
S6     134204   S5 OR S1
S7         22   S6(S)S2(S)S3
S8         22   IDPAT (sorted in duplicate/non-duplicate order)
S9          5   S8 AND PHASED()ARRAY? ?
S10       413   S6(S)S2
S11       119   S10 AND IC=(G01S OR H01Q OR H05K OR H01J OR G01K)
S12        11   S11 AND PHASED()ARRAY? ?
S13        11   IDPAT (sorted in duplicate/non-duplicate order)
S14        11   IDPAT (primary/non-duplicate records only)
?show files
File 348:EUROPEAN PATENTS 1978-2002/Nov W01
         (c) 2002 European Patent Office
File 349:PCT FULLTEXT 1979-2002/UB=20021107,UT=20021031
         (c) 2002 WIPO/Univentio
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Set     Items   Description
S1       4972   ISOTHERMAL
S2      45859   ANTENNA?
S3       2505   PHASED()ARRAY? ?
S4          0   S1(S)S2(S)S3
?show files
File 348:EUROPEAN PATENTS 1978-2002/Nov W01
         (c) 2002 European Patent Office
File 349:PCT FULLTEXT 1979-2002/UB=20021107,UT=20021031
         (c) 2002 WIPO/Univentio
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